

## SHORTER NOTES

✓ **Trichospira verticillata** (L.) Blake, n. comb.—*Bidens verticillata* L.! Sp. Pl. 2: 833. 1753. *Trichospira menthoides* HBK. Nov. Gen. 4: 28 t. 312. 1820. *T. biaristata* Less. Linnaea 4: 343. 1829. *Rolandra septans* Willd. ex Less. l. c. as syn. *Trichospira Pulegium* Mart. ex DC. Prod. 5: 91. 1836. *T. Prieurei* DC. l. c. (1836).—This common composite of the American tropics, from Vera Cruz to Brazil and Peru (*Ruiz & Pavon*, hb. Brit. Mus.), has long been known as *Trichospira menthoides* HBK. It is identical with Linnaeus's *Bidens verticillata*, based on the *Bidens* no. 4 of the Hortus Cliffortianus (399 (1737)), which was founded on specimens collected in Vera Cruz by Houston and now in the British Museum, and the name of this monotype must consequently be changed to the one given above. The achenial characters relied on by Lessing and de Candolle in their separations seem, as long ago noted by Bentham in the Genera Plantarum, to be of no consequence; the intermediate awns at the apex of the achene, formed by the excurrent ribs of the achene face, varying from none, to short deltoid teeth, or quite distinct short-aristulae on the same plant.

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## REVIEWS

**Bailey and Gilbert's Plant-Breeding\***

Volumes with this title written solely by the senior author have, during the past twenty years, passed through four editions with several reprintings. The last edition appeared in 1906 with the text in the form of six lectures. In the new edition this style of presentation is only slightly modified, making the book a popular treatise for the general reader and an elementary text for the student of plant-breeding.

One of the new chapters treats very excellently of the measurement of variation. The former treatments of mutations and of heredity have been expanded and treated in special chapters. As in the previous volumes, there is a glossary of terms, a bibliography, and, in addition, lists of books and periodicals treating

\* By L. H. Bailey, new revised edition by Arthur W. Gilbert. The Rural Science Series. Published by the MacMillan Company, 1915. Price \$2.00 net.

of plant-breeding subjects, and also a series of twenty-seven laboratory exercises for class instruction in plant-breeding.

During the nine years that have elapsed since the appearance of the fourth edition, there has been much investigation, especially with reference to the experimental phases of hybridization. To summarize adequately, critically and impartially these results is not a simple task, yet it is one which justifies the revision in question, and it is in this respect that the new volume is most defective.

For example, it is stated and in general maintained that characters such as the "presence or absence of pubescence on the leaves, the height of the plant, whether dwarf or tall, the color of the flower or fruit" are unit characters of which plants and animals are composed (p. 9). This we may note was the view held several years ago. Recent investigations and critical studies of the older investigations show that characters which behave as consistent units in hybridization are indeed rare.

The authors are fully aware (as intimated especially on pages viii, 128, 179, 185, and in Chap. III) that the older conceptions of the unity of characters, of dominance, of segregation into parental characters only, and of the purity of the germ cells formed by a hybrid have all been modified by numerous subsidiary hypotheses which attempt to account for increased variability, unexpected ratios and the appearance of intermediate characters. In fact, characters are now considered to be so complex in heredity that even the most enthusiastic Mendelians have discarded the term "unit-character" and substituted the rather intangible term "unit-factor."

It is clearly pointed out in the fourth edition (p. 166) and reiterated in the new edition (p. 168), in harmony with Bateson's views some ten years ago, that the most important and crucial point of Mendelian doctrine pertains to the assumed purity of the germ cells produced by hybrids with respect to pairs of contrasting characters. At the present time the evidence not only indicates that few if any characters are in any sense continuous units in heredity, but that also there may be all degrees of impurity in segregation, a condition fully admitted by Bateson

in a recent publication. The significance of these facts could and should be clearly presented in any popular treatise.

In the review of Mendel's work there is no mention of his report of investigations with beans, in which he found that the apparent unity of characters observed in *Pisum* did not prevail and in which he suggested what is essentially the multiple factor hypothesis of today.

Probably no phase of plant-breeding is of greater popular and scientific interest than that of mutation. Among investigators there is much diversity of opinion regarding this, and there is much conflicting evidence which would hardly be suspected by the treatment in the volume under consideration. In the first place, doctrines of mutation were based on the simple conception of unit-characters and have not been brought into close harmony with the revisions of that conception. Furthermore, de Vries does not consider that the loss of hereditary factors or characters is usually associated with a mutation. The hereditary units he conceives as either stable or labile. When labile they may change from active to inactive or latent, or to a semi-latent condition. It is not the presence or absence, the gain (with the exception of the few progressive mutations) or the loss of well-defined units as most Mendelians take for granted, but the varying degrees of activity of ever-present "pangens" that bring about mutations. This view of de Vries is not even considered by the writers (see page 193).

The treatment of graft-hybrids is decidedly inadequate if not misleading. The facts recently developed in connection with studies of graft-chimeras and graft-hybrids are undoubtedly of greater significance in their bearing on the fundamental principles of heredity than are those of any other line of investigation developed during the last decade. The excellent studies of the cell relations in *Cytisus Adami* in the *Crataegus-Mespilus* chimeras and in *Solanum tubingense*, *S. proteus*, *S. Koelreuterianum*, *S. Gaertnerianum* which are already treated in standard texts like Jost's *Pflanzenphysiologie* and the Strasburger text-book show that all these are periclinal chimeras. A few words regarding the cell relations in these plants would make clear their nature

and illustrate most excellently the visible effects of interaction between cells, which is a point of particular interest especially in relation to the expression of such characters as leaf-shape. The evidence that *S. Darwinianum* is a true fusion hybrid is not given. All this data is certainly well known by the authors, as is indicated by the discussion on page 148, but the treatment is hardly clear to one not already fully acquainted with the literature of the subject.

The bibliography includes no reference later than 1912, and in the list of books on plant-breeding there are some noticeable omissions of which we may mention Cramer's *Kritische Übersicht der bekannten Falle von Knospenvariation* published in 1907 and the recent volume by de Vries entitled *Gruppenweise Artbildung*.

The reviewer is in full sympathy with the purposes of the volume, with the excellent selection of the subject matter, and the interesting presentation which gives to volumes of this kind a well-deserved popularity.

The defects of the volume are those that are common to American text-books and popular treatments of scientific subjects. It seems to be the rule that the presentation must be simple and definite with little if any critical analysis of facts and theories, a treatment which gives an unwarranted air of finality and authority not in harmony with the subject itself and not stimulative to an attitude of inquiry on the part of the average reader.

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#### Illick's Pennsylvania Trees\*

This is an excellently conceived book of 231 pages, of which the first 52 pages, Part I, "is intended for the layman and the beginner of forestry" and "comprises abstracts from the author's lectures on elementary forestry at the Pennsylvania State Forest Academy." This part is neatly and comprehensively illustrated by numerous photographs and drawings, and constitutes a simple and compact treatment as to general considerations of the economic value, natural and artificial development, and eco-

\* Pennsylvania Trees, by J. S. Illick, professor of dendrology and forest management, Pennsylvania State Forest Academy. Bull. No. 11, Penn. Dept. Forestry, Harrisburg, Pa., 1914.